



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,760	01/09/2004	GERALD SCHULTZ	135556-1	1759
52082	7590	01/14/2009		
General Electric Company GE Global Patent Operation PO Box 861 2 Corporate Drive, Suite 648 Shelton, CT 06484			EXAMINER CHU, HELEN OK	
			ART UNIT	PAPER NUMBER
			1795	
			NOTIFICATION DATE	DELIVERY MODE
			01/14/2009	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gpo.mail@ge.com  
allyson.carnaroli@ge.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/707,760	<b>Applicant(s)</b> SCHULTZ, GERALD	
	<b>Examiner</b> Helen O. Chu	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. Applicant's amendments have been received on January 2, 2009. Claim has been amended.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action.

### ***Claim Objections***

3. The claims objections on claims 2, 13, 23 are withdrawn because the Applicants amended the claims.

### ***Claim Rejections - 35 USC § 112***

4. The claims rejections under 35 U.S.C 112, second paragraph, on claims 2, 13, 23 are withdrawn because the Applicants further clarified the claim language

### ***Claims Analysis***

5. "Functionalized perylenes" will be interpreted by the Examiner as "perylenes" due to the Applicants explanation. The explanation given by the Applicants did not differentiate between perylenes and functionalized perylenes.
6. It is noted that claims 1 and 21 have "intended use" language and it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

7. Claims 4, 5, 10, 11 comprises "means for" language, however, since the Applicants have not defined what the means of performing a certain function is, U.S.C 112, sixth have not been invoked.

***Claim Rejections - 35 USC § 102***

8. The rejections under 35 U.S.C 102(a), as being anticipated by Hakenjos et al. on claims 1-7, 10, 11, 14-16, 18, 19, 21-24 are withdrawn.

9. The rejections under 35 U.S.C 102(a), as being anticipated by Lamont et al. on claims 1-7, 10-12, 14-16, 18, 19, 21-24 are maintained. For purposes of convenient, the rejection is repeated below.

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-7, 10-12, 14-16, 18, 19, 21-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Lamont et al. (U.S. Patent 5,763,765)

In regards to claims 1-7, 10, 11, 14-16, 18, 19, 21-23 the Lamont et al. reference discloses a method and apparatus detects and locates perforations in a membrane. The test cell includes an anode, a cathode and an optical window (Figure 1, Component 12) to test perforations or leak in the membrane of a fuel cell causing the fuel and oxidant

streams to fluidly communicate and chemically react (Column 1-2, Lines 65-5). The Lamont et al. reference discloses that the anode and cathode reactions exothermically yield water (Column 1, Lines 50-55) and heat (Abstract). Infrared thermal imaging device detects the heat generated (Applicant's absorption) on the PEM which contains a thermally sensitive film (Applicant's source of input radiation) positioned in promixity to the PEM and process an image (Applicants detector) through a lense (Applicants' means for carrying the change) to a monitor (Component 46). The optical window (Fig. 1, 12) of the PEM is the input location of changes within the cell and further outputs the information to the lense (Fig. 3)

In regard to claim 12, the Lamont et al. reference discloses ion-exchange membrane to be a perfluorosulfonic membrane (Column 1, Lines 55-60)

In regards to claim 24, the Lamont et al. reference discloses electrically conductive sheets on opposite surfaces of the PEM (Column 1, Lines 20-25)

### ***Claim Rejections - 35 USC § 103***

12. The rejections under 35 U.S.C 103(a), as being anticipated by Hakenjos et al. on claim 12 is withdrawn.

13. The rejections under 35 U.S.C 103(a), as being anticipated by Lamont et al. as evidence by Klienerman on claims 3, 8, 9, 13 and 20 are maintained. The rejection is repeated below for convenience.

14. The rejections under 35 U.S.C 103(a), as being anticipated by Lamont et al. as in view of Yamashita et al on claims 3 and 20 are maintained. The rejection is repeated below for convenience.

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 3, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamont et al. (U.S. Patent 5,763,765) as evidenced by Klienerman (U.S. Patent 5,560,712).

The Lamont et al. reference discloses the claimed invention above and further incorporated herein. The Lamont et al. reference does not disclose a fluorophore operative to produce fluorescence in response to the input radiation and the water hydration present quenches the fluorescence in accordance to the concentration, however, the Kleinerman reference discloses that it is known to one of ordinary skill in the art for measuring temperature include the use of probes made of materials having temperature-dependent photo-luminescence properties. One of the earlier systems uses a photo luminescent material the luminescence intensity of which quenched appreciably with an increase of temperature. Luminescence quenching is usually associated with a decrease of the luminescence decay time of the material following the excitation of its luminescence pulsed or oscillatory light of wavelengths within an electronic absorption band characteristic of the material (Column 1, Lines 32-45). A

patent for a combination, which only unites old elements with no change in their respective functions, obviously withdraws what is already known into the field of its monopoly and diminishes the resources available to skillful men. Where the combination of old elements performed a useful function, but it added nothing to the nature and quality of the subject matter already patented, the patent failed under §103. When a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious.

17. Claim 13, 17 and 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lamont et al. (U.S. Patent 5,763,765) in view of Klienerman (U.S. Patent 5,560,712).

The Lamont et al. reference discloses the claimed invention above and further incorporated herein. The Lamont et al. reference does not disclose utilizing a fluorescent dye selected from the group comprising functionalized perylenes and binaphthyls and dihydroxy bipyridyles, however, the Kleinerman reference discloses a new technique which used fluorescent dyes such as bis-benzanthrone (Column 5, lines 1-10) which is a ketone perylene where temperature dependence of the index of refraction of the component of light guide can be used for measuring minute temperature changes, suitable for measuring smaller changes (Column 2, Lines 40-60) in temperature. A further example is 2.1 An infrared Image Converter where fluorescent dyes are used to absorb the reflected light intensity of the light of the wavelength, the thermal infrared image is thus converted into a fluorescence light image which can be

converted into a TV display (Column 9, Lines 11-20). Therefore, it would have been obvious to one of ordinary skill to incorporate the florescent dyes with reflected infrared light when monitoring thermal differences as disclosed by Kleinerman into the Infrared thermal monitoring of the apparatus as disclosed by Lamont et al. in order to measure temperature differences within the apparatus to a specific value resulting in more accurate evaluations.

18. Claims 3 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamont et al. (U.S. Patent 5,763,765) in view of Yamashita et al. (JP Publication 2001-124695). The Lamont et al. reference discloses the claimed invention above and further incorporated herein. The Lamont et al. reference does not specifically disclose a reflector opposing the aperture for reflecting input light towards the aperture, however, the Yamashita et al. reference illustrates an infrared reflector opposing the aperture in which the input IR light emits through (Figure 5). The Yamashita et al. reference adds that such orientation will raise the accuracy of the IR measurement by making the optical path crooked (Paragraph 55) with reflectors. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the reflecting plate on the opposing side of the window in which IR light enters as disclosed by Yamashita et al. into the PEM fuel cell which also uses IR light as disclosed by Lamont et al. in order to obtain more accurate measurements for testing which results in advance products.

***Response to Arguments***



19. Please note that the rejections are further clarified, no new rejections were made. Applicant's arguments filed 11/13/2008 have been fully considered but they are not persuasive. Applicant's principal arguments are:

A) Applicant's argue, "*The Lamont et al. reference is silent with respect to a source of input radiation directed at an input location on a PEM. In Lamont et al., pressurized hydrogen-rich gas is applied to an interior side of a membrane electrode assembly. If there is a perforation in the membrane, then the hydrogen-rich gas on one side of the membrane will come into contact with air on the other side of the membrane, creating an exothermic reaction which can be detected by infrared camera 40 (see col. 5, lines 57-67). Applicants respectfully submit that hydrogen gas as disclosed in Lamont et al. would not be considered as a source of input radiation by one of ordinary skill in the art at the time of invention. However, the hydrogen gas is not considered a source of input radiation. The Lamont et al. reference discloses that the infrared apparatus includes an infrared thermal imaging device including an infrared heat detection camera directed at the membrane (Applicant's source of input radiation directed at an input location on the PEM).*

B) The Applicants argue, "*Further, independent claim 1 also recites a detector for determining a sensible change in the input radiation indicative of a level of water hydration in the PEM. Lamont et al. uses an infrared detector to measure an exothermic reaction between hydrogen gas and air. There is no suggestion in Lamont et al. of detection of water hydration in a PEM.*" However, these are intended use language. It is noted that claims 1 and 21 have "intended use" language and it has been

held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

C) The Applicants argue, “*Finally, since Lamont et al. does not disclose a source of input radiation directed at an input location on a PEM, it cannot disclose a change in the input radiation as recited in claim 1. Applicants respectfully submit that similar features are recited in independent method claim 21.*” However, the claim language was interpreted by the Examiner as “a source” “directed at an input location on a PEM,” “input radiation” is to describe the “source.” By this interpretation, the infrared thermal image device which has an input radiation to the detector, is directed at an input location on the PEM.

D) The Applicants argue, “*First, claims 3, 8, and 9 are allowable at least based on their dependency on claim 1 for the reasons discussed above. Next, Applicants respectfully submit that the grounds of rejection are improper since there is no discussion relating to any motivation or reason for the combining the references. Further, Klienerman relates to optical temperature sensors. Like Lamont et al, there is no disclosure of using the Klienerman optical temperature sensor to indicate a level of water hydration in a PEM*” However, the rejection reads *Lamont et al.* as evidence by *Klienerman*. No motivation is required when citing a prior art as evidence by

E) Applicant argues, “*First, Applicants respectfully submit that claims 13, 17, and 20 are allowable at least based on their dependency on claim 1 for the reasons*

*discussed above. Next, the "dyes" cited as being used in the Klienerman device at col. 5, lines 1-10 are used as cladding of an optical sensor. In the present invention, the dyes are used as a material forming the PEM in exemplary embodiments. There is no suggestion of using dyes in a PEM in Klienerman. Further, Applicants fail to see how dyes would be incorporated into the Lamont et al. device since Lamont et al. measures exothermic reactions between hydrogen-rich gas and air without an input source of radiation, or even without an optical sensor"* Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Also, a prior art reference is analogous if the reference is in the field of the applicant's endeavor or, if not, the reference is reasonably pertinent to the particular problem with which the inventor was concerned. In re Oetiker 977 F.2s 1443, 1446, 24 USPQ 24 USPQ2d 1443, 1445 (Fed. Cir. 1992)

### **Conclusion**

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen O. Chu whose telephone number is (571) 272-5162. The examiner can normally be reached on Monday-Friday 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HOC

Application/Control Number:  
10/707,760  
Art Unit: 1795

Page 12

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795